BOKSHITSKAYA, V.I. (Moskva)

Secrets of a living cell. Priroda 54 no.8:110-112 Ag '65.
(MIRA 18:8)

SHEVCHENKO, A.A.; BOKSHITSKAYA, N.A.

Method for corrosion testing of plastics. Trudy MIKHM 28: 232-237 '64. (MIRA 19:1)

EWT(m)/EWP(t)/ETI IJP(c) JD/JG/GD

ACC NR: AT6013551 (A) SOURCE CODE: UR/0000/65/000/000/0052/0054

AUTHOR: Yelyutin, O. P.; Bokshitskiy, I. Ya.; Rogova, I. V.

49
B+1

ORG: Institute of Steel and Alloys (Institut stali i splavov)

TITLE: Some physical properties of the compounds of niobium with transition elements ($NbCr_2$, $NbCo_2$, $NbFe_2$)

27

SOURCE: AN UkrSSR. Institut problem materialovedeniya. Vysokotemperaturnyye neorganicheskiye soyedineniya (High temperature inorganic compounds). Kiev, Naukova dumka, 1965, 52-54

TOPIC TAGS: niobium, transition element, chromium, cobalt, iron

ABSTRACT: The type of crystal lattice, the temperature dependences of normal resistivity modulus (E) and electrical conductivity (R), the specific electrical resistivity (G), the thermal coefficient of electrical conductivity (dp), the paramagnetic susceptibility (χ), the absolute thermoelectric force at 20°-100°C, the coefficient of thermal expansion (β) at 20°-900°C, the normal modulus of elasticity (E), the temperature dependence of elasticity modulus (β_E), and the hardness were determined for $NbCr_2$, $NbCo_2$, and $NbFe_2$ samples. The samples were prepared by soaking liquid-phase metals into quartz ampoules 3 mm in diameter. They were subsequently homogenized by holding for 4 hours at 1000°C. The temperature dependence of the normal modulus of

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elasticity (a) and the electrical resistivity (b) of $NbCr_2$, $NbCo_2$, and $NbFe_2$ are graphed. Data on physical properties of $NbCr_2$, $NbCo_2$, and $NbFe_2$ are presented in tabular form. Orig. art. has: 1 figure, 1 table.

SUB CODE: 07/ SUBM DATE: 03Jul65/ ORIG REF: 003

ACC NR: AP6002905 SOURCE CODE: UR/0286/65/000/024/0072/0072

EWP(t)/EWP(z)/EWP(b) IJP(c) JD/HW/JT

INVENTOR: Yelyutin, O. P.; Bokshitskiy, I. Ya.; Rogova, I. V.; Sorokin, M. N.

ORG: none

TITLE: High-resistivity alloy. Class 40, No. 177075 [announced by Central Scientific Research Institute of Ferrous Metallurgy im. I. P. Bardin (Tsentral'nyy nauchno-issledovatel'skiy institut chernoy metallurgii)]

SOURCE: Byulleten' izobreteniy i tovarnykh znakov, no. 24, 1965, 72

TOPIC TAGS: alloy, high resistivity alloy, nickel containing alloy, manganese containing alloy, vanadium containing alloy

ABSTRACT: This Author Certificate introduces a high-resistivity alloy containing 42—50% Ni, 40—46% Mn, and 4—18% V. [ND]

SUB CODE: 11/ SUBM DATE: 11May64/ ATD PRESS: 4158

Card 1/1

UDC: 669.245.018.54

L 09964-67 EWP(e)/EWT(m)/EWP(t)/ETI IJP(c) JD/HW
ACC NR: AP6035722 SOURCE CODE: UR/0413/66/000/019/0084/0084

INVENTOR: Yelyutin, O. P.; Bokshitskiy, I. Ya.; Rogova, I. V.; Sorokin, M. N. 36

ORG: none

TITLE: High-resistivity alloy. Class 40, No. 186694 [announced by the Central Scientific Research Institute of Ferrous Metallurgy im. Bardina (Tsentral'nyy nauchno-issledovatel'skiy institut chernoy metallurgii)]

SOURCE: Izobreteniya, promyshlennyye obraztsy, tovarnyye znaki, no. 19, 1966, 84

TOPIC TAGS: nickel manganese alloy, high resistivity alloy, titanium containing alloy, cobalt containing alloy

ABSTRACT: This Author Certificate introduces a high-resistivity nickel-manganese-base alloy containing 45—50% nickel, 43—48% manganese, and 2—12% titanium at a nickel to manganese ratio of 1.0—1.07:1.0. A variant has 5% max titanium and 5—15% iron and/or cobalt to improve ductility.

SUB CODE: 11/ SUBM DATE: 10Aug65/ ATD PRESS: 5105

Card 1/1 UDC: 669.018.54: :669.245'74'295

ACC NR: AP6036839 SOURCE CODE: UR/0020/66/171/002/0320/0323

AUTHOR: Bokshitskiy, I. Ya.; Yelyutin, O. P.; Rogova, I. V.; Sorokin, M. N.

ORG: Central Scientific Research Institute of Ferrous Metallurgy im. I. P. Bardin (Tsentral'nyy nauchno-issledovatel'skiy institut chernoy metallurgii)

TITLE: Influence of group-IV transition elements and of Cu on the structure and physical properties of alloys based on the compound NiMn

SOURCE: AN SSSR. Doklady, v. 171, no. 2, 1966, 320-323

TOPIC TAGS: nickel alloy, manganese containing alloy, transition element, alloy, phase diagram, resistivity, electric property

ABSTRACT: To investigate the structure and physical properties of alloys of the compound NiMn with transition elements, the authors fused pseudobinary alloys NiMn-Me (Ti, V, Cr, Fe, Co, Cu) containing 1-20 at.% V and Ti, and 1-10 at.% Cr, Fe, Co, Cu. The tests considered of a dilatometric analysis in the 100 -- 950° interval, measurements of the electric resistivity as a function of the alloying-additive content, an electron-microscopic investigation of the structure, and an x-ray phase analysis. The dependence of the electric properties and of the structure of the alloy as a function of the heat treatment was tested in the case of NiMn + 10 at.% V. The tests yielded the phase compositions of the different alloys and the types of crystal

Card 1/2 UDC: 669.018.5:669.017.11:537.3:669.017.3:621.78

ACC NR: AP6036839

structure. The results indicate that the observed high resistivity of the alloys is connected with the structure of the metastable γ' phase and depends on the nature of the alloying elements. The necessary condition for obtaining the γ' phase is quenching from the unstable β phase which exists in such alloys. The resistivity decreased as a rule with increasing atomic number of the additive, and increased very strongly with increasing atomic percentage of the additive. This report was presented by Academician G. V. Kurdyumov 4 February 1966. Orig. art. has: 3 figures and 2 tables.

SUB CODE: 20, 11/ SUBM DATE: 03Feb66/ ORIG REF: 007/ OTH REF: 005

Card 2/2

L 10033-67 EWP(e)/EWT(m) WH
ACC NR: AP6022908 (A,N) SOURCE CODE: UR/0292/66/000/004/0035/0037

AUTHOR: Gaydash, B. I. (Engineer); Glushchenko, V. N. (Engineer); Boldyreva, T. I. (Engineer); Kotelevtsev, V. G. (Engineer)

ORG: none

TITLE: Line insulators designed for hard climatic conditions

SOURCE: Elektrotekhnika, no. 4, 1966, 35-37

TOPIC TAGS: electric insulator, high voltage insulator, PFYe-16 insulator, PFYe-11 insulator, PFYe-4,5 insulator

ABSTRACT: Three small-size line sustension 110—500-kv insulators intended for operation under hard climatic conditions (high temperature, natural and industrial contamination, etc.) have been developed by the Central Scientific Research Laboratory of the "Elektroset'izolyatsiya." Their dimensions, electrical and

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UDC: 621.315.624.8.001.3

6

mechanical characteristics are reported, as well as the distinguishing features of their design. The principal electrical characteristics are:

Type	Flashover voltage, kv Dry	Wet	Breakdown	Weight, kg
PFYe-16	85	55	125	12.8
PFYe-11	85	55	125	9.0
PFYe-4,5	75	40	110	5.2

Also, electrical and mechanical characteristics and composition of the Soviet-made porcelain from which the above insulators are made, are reported. "Engineers S. I. Ivakhin, V. I. Kotlik, V. I. Zhirov, A. A. Novak and S. A. Izotova took part in the project." Orig. art. has: 1 figure and 3 tables.

SUB CODE: 09/10/ SUBM DATE: none / ORIG REF: 002

Card 2/2 ank

BRUSKIN, D.E., dotsent. Prinimali uchastiye: SENILOV, G.N., dotsent; BASOVA, B.K., dotsent; BOKSHITSKIY, L.V., prepodavatel'; LUGOVOY, G.F., prepodavatel'; CHUMAKOV, N.M., prepodavatel'. SENKEVICH, A.M., dotsent, red.; CHAROV, A.D., tekhn.red.

[Electric equipment of airplanes] Elektrooborudovanie samoletov. Moskva, Gos.energ.izd-vo, 1948. 464 p. (MIRA 12:6)

1. Kafedra inzhenerno-aviatsionnoy sluzhby Moskovskogo ordena Lenina energeticheskogo instituta im. V.M.Molotova (for all except Senkevich, Charov).
(Airplanes--Electric equipment)

BOKSHITSKIY, L. V.

BOKSHITSKIY, L. V., and D. E. BRUSKIN.

Elektroprivod na samolete. Ucheb. posobie po spetsoborudovaniiu samoletov dlia tekhnicheskogo sostava VVS. Moskva, Voen. izd-vo, 1949. 175 p., illus.

Bibliography: p. 174.

Title tr.: Electric drive systems for aircraft. A textbook of special airplane equipment for the technical personnel of the Air Force.

TL690.B7

SO: Aeronautical Sciences and Aviation in the Soviet Union, Library of Congress, 1955.

S/144/60/000/05/005/014
E041/E235

AUTHORS: Bokshitskiy, L. V., Senior Lecturer, and Shlykov, F. M., Assistant, Chair on Computing

TITLE: Electrical Simulation of an AC Servomechanism

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Elektromekhanika, 1960, Nr 5, pp 52-61 (USSR)

ABSTRACT: The problem arises in connection with the design of 400 c/s auxiliaries in aircraft. The behaviour of follow-up systems using induction motors is quite different from those using d.c. motors and separate simulation methods are needed. The features requiring special attention are the non-linearity of the motor response and the use of switching circuits for reversal of drive. Fig 1 shows the essential features of the system considered. The three stator windings are fed through saturable reactors. The magnetic amplifier which drives the control windings on the reactors has two inputs. One from a tachometer and the other from a selsyn receiver mounted on the motor shaft. (Actually the latter is in duplicate, with fine and coarse ranges and a sector switching device operating in accordance with Eq (2)). The amplifiers are Ramey type. Fig 2

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Electrical Simulation of an AC Servomechanism

shows the block diagram of the system with all the relevant transfer functions. The latter are given for the amplifier in Eq (3), the reactor in Eq (6), the motor in Eq (7), the rate-feedback connection in Eq (10). The equivalent circuit of the amplifier is in Fig 3, while Fig 4 shows the means adopted to synthesize the torque-speed characteristic of the motor represented by Eq (16). The operation of division required here is performed by the interconnection of multiplier and adder as in Fig 5. The method so far proposed proves to be unstable; a large amplifier gains. Eq (16) can be replaced by Eq (23) if the mechanical characteristic of the motor does not include any sharp changes in critical slip with control current. Fig 6 compares the actual torque-speed curves with the simplified simulation. The system equations are thus now given by Eqs (24) to (33) and the simulator equations by Eqs (34) to (43). The latter represent the actual connections used in Fig 7. The actual and simulated motor responses are compared in Figs 9 and 10 for conditions of starting and sudden rotation of the transmitter synchro by 90°.

S/144/60/000/05/005/014
E041/E235

Electrical Simulation of an AC Servomechanism

The simulator is used for taking frequency responses in the region 0.1 to 5.0 c/s and finding the effect of variations in amplifier lag, time-constant of the stabilizing loop and the dead-time of the reversing switch. The work was carried out on the MN-2 machine with the assistance of N. I. Chelnokov. There are 10 figures and 4 Soviet references.

ASSOCIATION: Moskovskiy energeticheskiy institut (Moscow Power Institute)

SUBMITTED: November 6, 1959

Card 3/3

BOKSHITSKIY, Leonid Vladimirovich, kand. tekhn. nauk; BRUSKIN, David Emanuilovich, doktor tekhn. nauk, prof., red.

[Electrical starting systems of airplane engines] Sistemy elektricheskogo zapuska aviatsionnykh dvigatelei. Moskva, Mosk. energ. in-t, 1963. 103 p. (MIRA 18:1)

KAGAN, D.F.; BOKSHITSKIY, M.N.

Investigation of the strength of thermoplastic pipes under continuous load. Sbor.trud.NIIST no.8:135-194 '61. (MIRA 15:5)
(Pipe, Plastic) (Thermoplastics)

BOKSHITSKIY, M.N.; KAGAN, D.F.

Investigation of the strength of some thermoplastic tubes under impact load. Sbor.trud.NIIST no.8:195-203 '61. (MIRA 15:5)
(Pipe, Plastic) (Thermoplastics)

S/191/62/000/002/003/008
B110/B101

AUTHORS: Bokshitskiy, M. N., Kagan, D. F., Klinov, I. Ya.

TITLE: Thermoplastic pressure piping. Communication I. Mechanical strength of pipes

PERIODICAL: Plasticheskiye massy, no. 2, 1962, 38 - 44

TEXT: In this paper, the mechanical strength of pipes under a static load is estimated. To determine the relations among time, tension, and temperature, the durability curves are divided into two linear sections: (a) a flat one and (b) a steep one separated by the point of inflection. In (a), plastic destruction occurs with uniform deformation of the whole specimen as long as the wall thickness remains unchanged. Swelling spreads radially and axially, and intensive orientation and fracture in the destruction zone occur at a right angle to the pipe axis. Deformation in highly elastic PE (especially high-pressure PE) is largely reversible. In (b), brittle destruction occurs due to cracking and partial, highly elastic deformation. $\tau = B \cdot \exp[(U_0 - \gamma)/kT]$ is valid with U_0 being the

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energy constant of destruction dependent on the material properties (in metals it corresponds to the sublimation energy), γ being a structure-sensitive constant depending on orientation, working methods, etc., and B being a constant dependent on temperature and stress. The coordinates of the "brittle point" are: $x_h = (b_h - b_p)/(k_p - k_h)$; $y_h = (k_p b_h - k_h b_p)/(k_p - k_h)$, where b_p and b_h are the strengths in plastic and brittle destruction at T_i, k_p and k_h are the temperature-dependent constants. $\sigma_h = B\tau_h^n$ with B being C'/C_1^n and $n = \lambda'/\lambda$ is derived for the instantaneous strength in brittle destruction which thus depends only on stress. Plastic destruction occurs with $\sigma > \sigma_h$, and brittle destruction in praxis occurs at $\sigma < \sigma_h$. The boundary values of stress and durability which correspond to the brittle transition, are determined from

$$\tau_h = C \cdot e^{-\lambda \cdot T_i}$$

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$$C = \left(\frac{A_h}{A_p}\right)^{\frac{1}{k_p - k_h}} \quad \text{и} \quad \lambda = \frac{a_p - a_h}{k_p - k_h} \qquad (8) \text{ and}$$

$$\sigma_h = C' \cdot e^{-\lambda' \tau_l}$$

$$C' = \left(\frac{A_h^{k_p}}{A_p^{k_h}} \right)^{\frac{1}{k_p - k_h}} \quad \text{и} \quad \lambda = \frac{k_h \alpha_p - k_p \alpha_h}{k_p - k_h} \qquad (9).$$

A_p, α_p, A_h, α_h are constants depending on the loading rate. The time dependence of strength $\sigma = A\tau^{-n} \cdot e^{-\alpha T}$ with A, n, and α being empirical constants, also holds for PE pipes with constant, linear characteristics. The authors (Author's Certificate no. 130225 of September 3, 1959, Vestnik tekhniko-ekonom. inform. NIITEKhIM, no. 5, 14 (1960)) studied Soviet PVC, high-pressure PE-500 (LE-500) PE (of the Okhtinskiy khimicheskiy kombinat (Okhta Chemical Combine)) and low-pressure PE (of the NIIPM) by the pin and cone methods. In relaxation tests, only brittle fracture was observed independent of deformation. It usually started on the external surface at a right angle to the stress direction, with a parabolic destruction front. The velocity of the "avalanche crack" increases linearly with time. High-pressure PE is sensitive to

stress concentrators. The initial embryonic crack has a smooth surface characteristic of brittle fractures. On further propagation of the "avalanche crack" from the point of stress concentration, the fracture surface becomes rough due to retarding elasticity. Low-pressure PE usually breaks in the center section with a smooth surface; its durability is lower than that of high-pressure PE. A 1.5 - 2% deformation is assumed to be comparatively safe. Ring-shaped PVC microsamples of the Vladimirskiy khimicheskiy zavod (Vladimir Chemical Plant) were examined in various media at 20 - 80°C. A steep initial drop in stress is characteristic of PE relaxation curves. The propagation velocity of the "avalanche crack" increases with time and temperature up to 40 - 45°C. At 55 - 60°C, however, high elasticity predominates. A temperature rise from 20° to 100°C reduces the strength of high-pressure PE to 1/9; the strength of low-pressure PE is reduced by 50% due to a temperature rise from 20° to 60°C. There are 9 figures and 17 references: 11 Soviet and 6 non-Soviet. The three references to English-language publications read as follows: L. F. Sansone, SPE Journal, No. 5, 418 (1959); ASTM-Bulletin, No. 12, 25 (1956); A. A. Griffith, Phil. Trans. Roy. Soc., 221, 163 (1921).

S/081/62/000/017/082/102
B177/B186

AUTHORS: Bokshitskiy, M. N., Kagan, D. F.

TITLE: Investigation of the strength of pipes composed of several thermoplastics under impact loading conditions

PERIODICAL: Referativnyy zhurnal: Khimiya, no. 17, 1962, 538, abstract 17P10 (Sb. tr. N.-i. in-t. san. tekhn. Akad. str-va i arkhitekt. SSSR no. 8, 1961, 195 - 203)

TEXT: Existing test methods, particularly the MCO (ISO) method, are shown to be inadequate, and the authors call for the development of new and improved types of dynamic testing of plastic pipes. A new test method is proposed, using an ordinary pendulum drop-hammer of the Charpy type fitted with a specially designed pendulum. In devising the new method, the authors had in mind particularly the behavior of tubes damaged by tangential stresses with rapid build-up. A test method is described, stating the values obtained for the specific impact strength of pipes composed of various thermoplastics. [Abstracter's note: Complete translation.]

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BOKSHITSKIY, M.N.; KAGAN, D.F.; KLINOV, I.Ya.

Delivery conduits made of thermoplastics. Estimation of strength. (MIRA 15:4)
Plast.massy no.3:38-44 '62.
(Pipe, Plastic)

KAGAN, D.F.; BOKSHITSKIY, M.N.; DUBROVKIN, S.D.

Study of the fastening elements of interior plastic piping. Sbor. trud. NIIST no.12:66-83 '62. (MIRA 16:3)
(Pipe fittings) (Pipe, Plastic)

KAGAN, D.F., kand.tekhn.nauk; BOKSHITSKIY, M.N., kand.tekhn.nauk

Analysis of ways of using thermoplastic pipes in hot-water supply systems. Vod. i san. tekh. no.5:9-14 My '63. (MIRA 16:6)
(Pipe, Plastic) (Thermoplastics)

L 51987-65 EPF(c)/EPR/EWA(h)/EWP(j)/EWP(k)/EWT(d)/EWT(m)/T/EWA(d)/EWP(v)/EWP(w) Pc-4/Pr-4/Pr-4/Ps-4/Peb EM/WW/RM

ACCESSION NR: AT5012207 UR/3078/64/028/000/0132/0150

AUTHOR: Bokshitskiy, M. N.; Klinov, I. Ya. (Doctor of technical sciences, Professor)

TITLE: Influence of the type of stress on the mechanical strength of polyethylene

SOURCE: Moscow. Institut khimicheskogo mashinostroyeniya. Trudy, v. 28, 1964. Korroziya khimicheskoy apparatury (Corrosion of chemical apparatus), 132-150

TOPIC TAGS: polyethylene, polymer corrosion, polymer strength, polymer stress, polyethylene embrittlement

ABSTRACT: On the basis of a theoretical analysis, the article gives recommendations for the design of supporting structures made of polyethylene. The discussion consists of three sections: (1) Failure under unidirectional extension, (2) failure under a combination of stresses, and (3) failure of a tube loaded with an additional axial force. A combination of stresses was found to have a specific influence on the mechanical strength of polyethylene, accelerating the onset of the period of brittle failure. Using model considerations, the authors obtain theoretical equations for the "line of brittleness." These equations are in [illegible] agreement with the experimental data. Results of calculations show that an

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L 51987-65

ACCESSION NR: AT5012207

increase in temperature has an intensifying influence on the embrittlement of polyethylene, and that the temperature factor is independent of the type of stress condition present. Orig. art. has: 7 figures and 68 formulas.

ASSOCIATION: Moskovskiy institut khimicheskogo mashinostroyeniya (Moscow Institute of Chemical Machine Building)

SUBMITTED: 00 ENCL: 00 SUB CODE: MT

NO REF SOV: 004 OTHER: 002

Card 2/2

BOKSHITSKIY, Vladimir Veniaminovich; ALEKSEYEV, M.A., red.; VARGANOVA, A.N., red.; KOMIASHINA, A.D., tekhn. red.

[Plastics and their fire hazards] Plasticheskie massy i ikh pozharnaia opasnost'. Pod red. M.A. Alekseeva. Moskva, Izd-vo M-va kommun. khoz. RSFSR, 1958. 150 p. (MIRA 11:7)
(Plastics)

LEYKIN, V.Ye.; BOKSHITSKIY, Ya.M., redaktor; VAYNSHTEYN, Ye.B., tekhnicheskiy redaktor.

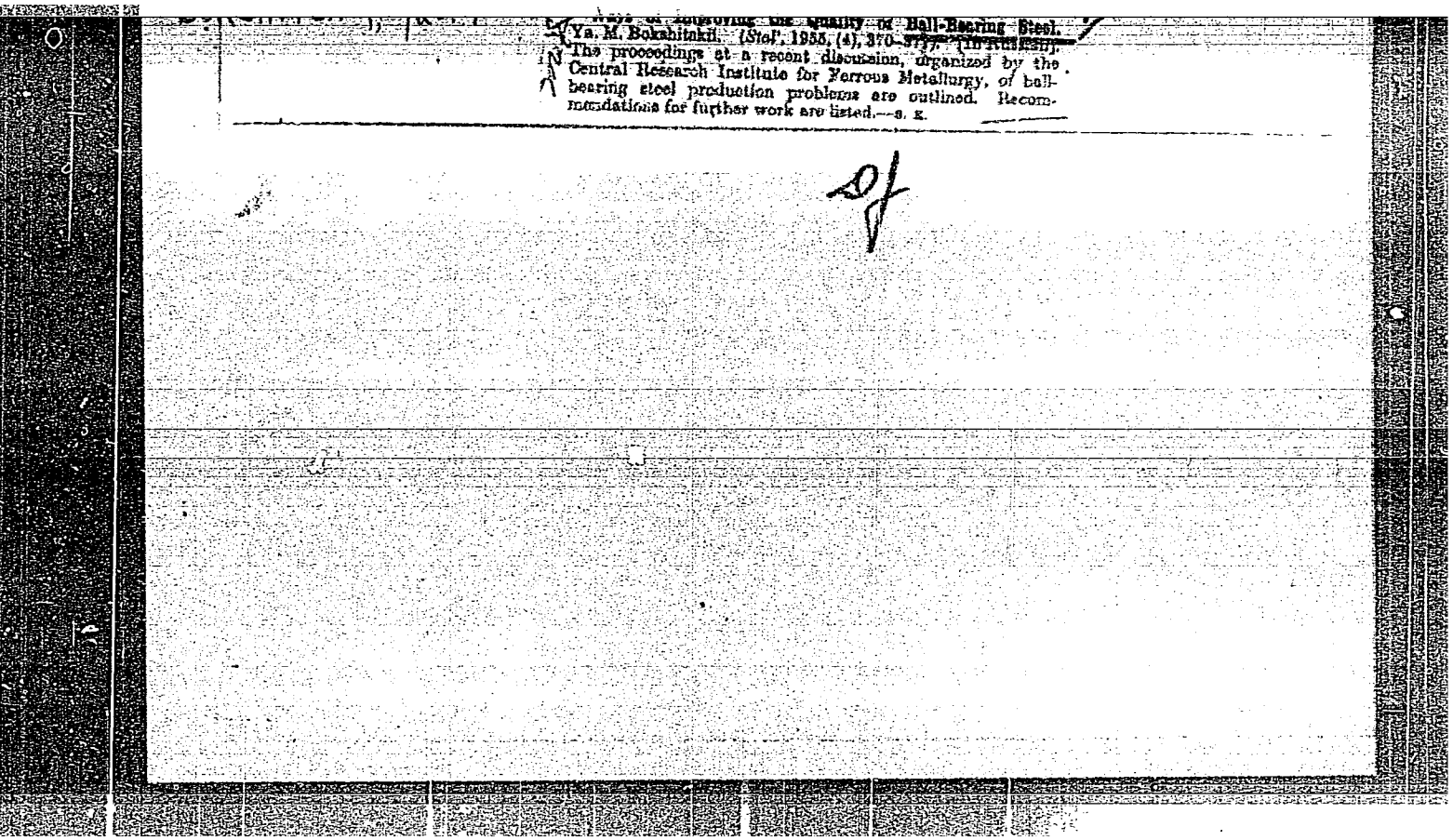
[Steel smelting in electric furnaces] Plavka stali v elektropechakh. Izd. 2-e, dop. i perer. Moskva, Gos. nauchno-tekhn. izd-vo lit-ry po chernoi i tsvetnoi metallurgii, 1951. 427 p. [Microfilm] (Steel--Electrometallurgy) (Electric furnaces) (MLRA 7:11)

YEDNERAL, Fedor Prokop'yevich; BOKSHITSKIY, Ya.M., redaktor; CHERNYAK,I.G., redaktor; VAYNSHTEYN, Ye.B., tekhnicheskiy redaktor

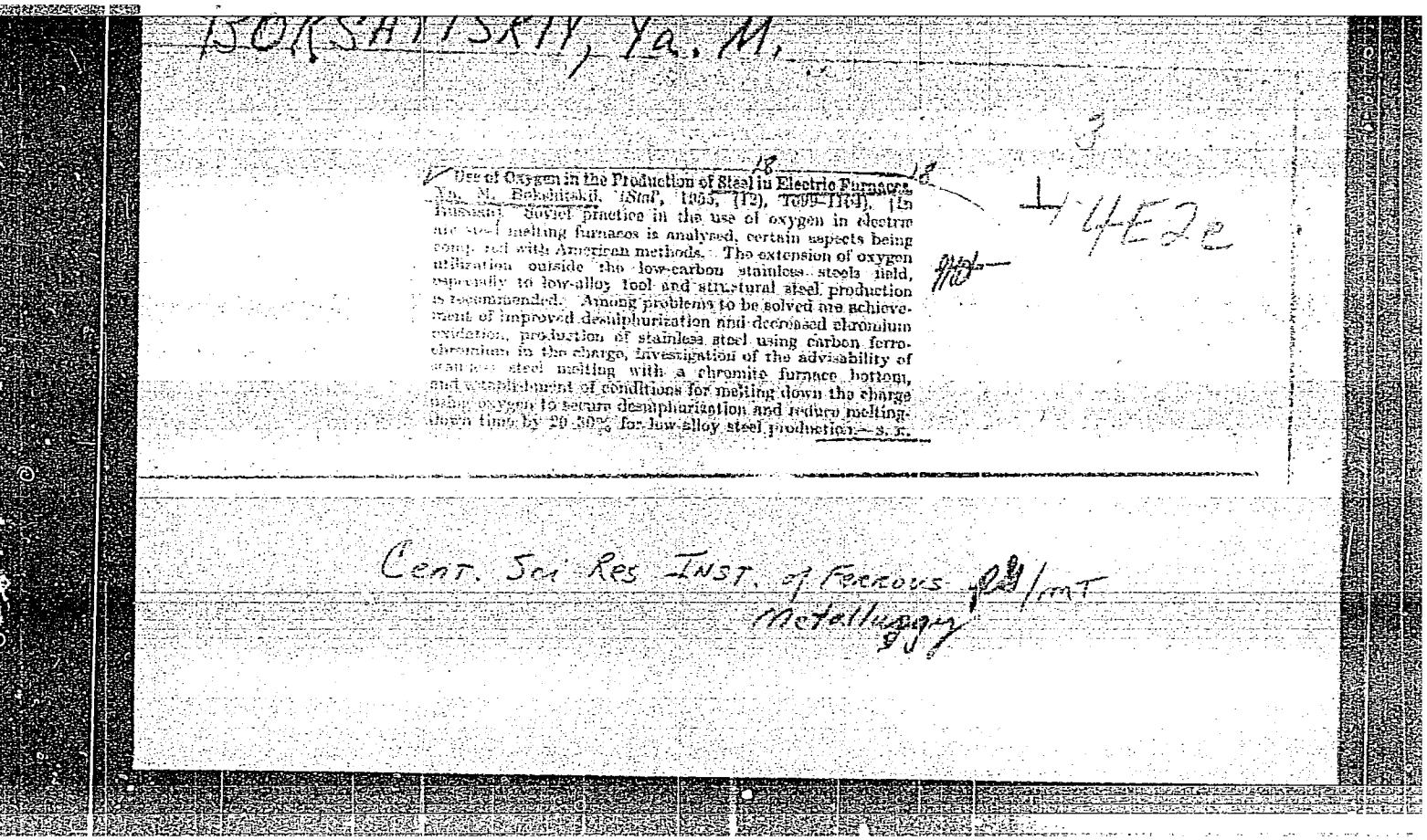
[Electrometallurgy of steel and ferroalloys; a general course] Elektrometallurgiia stali i ferrosplavov; obshchii kurs. Moskva, Gos.nauchno-tekhn. izd-vo lit-ry po chernoi i tsvetnoi metallurgii, 1955. 510 p.
(Electrometallurgy) (MLRA 9:1)

New technology of melting of stainless steel in the arc electric furnace with the use of oxygen. Ya. M. Bok-shtein. *Primenenie Kisloroda v Metallurg. Protsessakh* (Moscow: Izdatel. Akad. Nauk S.S.S.R.) *Sbornik* 1955 169-70; *Referat. Zhur., Met.* 1956, No. 6103.—A new technology of making stainless steel makes it possible to use in the charge up to 75% of steel scrap and also to lower the C content of the melted steels. The charge is composed of scrap stainless and nickel alloys, structural steel, and soft iron. Si content in the charge was increased by addn. of high-silicon scrap. The melting and decarburization are effected under clay slag. Blowing with O accelerates melting of the charge, decarburization, and melting of Fe-Cr added after decarburization. After blowing, the slag is deoxidized with 75% Fe-Si, Si-Ca, and Si-Cr. Before the addn. of Fe-Ti, the slag is tapped off and a new one is made with lime and fluorspar. The temp. of the bath is regulated by addn. of alloys and also by interrupting the elec. power for a considerable time. By this method it was possible to decrease scrap by more than half and completely to eliminate scrap due to bubbles. The life of the furnace lining was satisfactory. The capacity of the furnace increased up to 25%, the time of smelting decreased considerably, the consumption of energy decreased 30%, and the cost per ton of ingot decreased.

Alexis N. Pestoff



Ways of Improving the Quality of Ball-Bearing Steel.
Ya. M. Bokshitskii. (Stal', 1955, (4), 370–372). (In Russian).
The proceedings at a recent discussion, organized by the Central Research Institute for Ferrous Metallurgy, of ball-bearing steel production problems are outlined. Recommendations for further work are listed.—s. g.



BORISHITSKII, Ya. M.

Use of Oxygen in the Production of Steel in Electric Furnaces. Ya. M. Borishitskii. *Stal'*, 1955, (12), 1099–1104. (In Russian) Soviet practice in the use of oxygen in electric arc steel melting furnaces is analysed, certain aspects being compared with American methods. The extension of oxygen utilization outside the low-carbon stainless steels field, especially to low-alloy tool and structural steel production is recommended. Among problems to be solved are achievement of improved desulphurization and decreased chromium oxidation, production of stainless steel using carbon ferrochromium in the charge, investigation of the advisability of stainless steel melting with a chromite furnace bottom, and establishment of conditions for melting down the charge using oxygen to secure desulphurization and reduce melting-down time by 20–30% for low-alloy steel production.—S. K.

4E2e

Cent. Sci. Res. Inst. of Ferrous Metallurgy

BOKSHITSKIY, Ya.M.

Methods of calculating electric arc steel-melting furnaces.
Stal' 15 no.7:646-647 Jl '55. (MLRA 8:9)

1. TSentral'nyy naucho-issledovatel'skiy institut chernoy metallurgii.
(Electric furnaces)

Some recent views on the design and rating of steel-making arc furnaces are critically reviewed.

BOKSHITSKIY, Ya.M., inzhener.

Use of oxygen in transformer steel smelting. Sbor.trud. TSNIICHM no.13:340-353 '56. (MLRA 9:11)
(Steel--Electrometallurgy)
(Oxygen--Industrial applications)

BOKSHITSKIY, Ya. M.

14697* (Russian.) Preventing Axial Cracks in Alloy Steel Ingots. Ustranenie obrazovaniia osevykh treshchin v slitkakh legirovannoi stali. Ia. M. Bokshitskii, M. A. Pertsev, and F. V. Kozlov. *Stal'*, v. 16, no. 7, June 1956, p. 602-608.

Causes of axial cracks in Cr-Ni-W steel ingots. Preventing these defects by slowing down the rate of cooling in the mold or by casting semi-molten metal in heated molds.

BOKSHITSKIY, Ya.M.

REYLINA, TS.O., inzhener; BLAGONADEZHDIN, V.Ye., inzhener; BOGUSLAVSKIY, P.Ye., kandidat tekhnicheskikh nauk; VORONKOV, I.M., professor, GITINA, L.Ya., inzhener; GROMAN, M.B., inzhener; GOROKHOV, N.V., doktor tekhnicheskikh nauk [deceased]; DENISYUK, I.N., kandidat tekhnicheskikh nauk; DOVZHIK, S.A., kandidat tekhnicheskikh nauk; DUKEL'SKIY, M.P., professor, doktor khimicheskikh nauk [deceased]; DYKHOVICHNYY, A.I., professor; ZHITKOV, D.G., professor, doktor tekhnicheskikh nauk; KOZLOVSKIY, N.S., inzhener; LAKHTIN, Yu.M., doktor tekhnicheskikh nauk; LEVENSON, L.B., professor, doktor tekhnicheskikh nauk [deceased]; LEVIN, B.Z., inzhener; LIPKAN, V.F., inzhener; MARTYNOV, M.V., kandidat tekhnicheskikh nauk; MOLEVA, T.I., inzhener; NOVIKOV, F.S., kandidat tekhnicheskikh nauk; OSETSKIY, V.M., kandidat tekhnicheskikh nauk; OSTROUMOV, G.A.; PONOMARENKO, Yu.F., kandidat tekhnicheskikh nauk; RAKOVSKIY, V.S., kandidat tekhnicheskikh nauk; REGIRER, Z.L., inzhener; SOKOLOV, A.N., inzhener; SOSUNOV, G.I., kandidat tekhnicheskikh nauk; STEPANOV, V.N., professor; SHEMAKHANOV, M.M., kandidat tekhnicheskikh nauk; EL'KIND, I.A., inzhener; YANUSHEVICH, L.V., kandidat tekhnicheskikh nauk; BOKSHITSKIY, Ya.M., inzhener, redaktor; BULATOV, S.B., inzhener, redaktor; GASHINSKIY, A.G., inzhener, redaktor; GRIGRO'YEV, V.S., inzhener, redaktor; YEGURNOV, G.P., kandidat tekhnicheskikh nauk, redaktor; ZHARKOV, D.V., dotsent, redaktor; ZAKHAROV, Yu.G., kandidat tekhnicheskikh nauk, redaktor; KAMINSKIY, V.S., kandidat tekhnicheskikh nauk, redaktor; KOMARKOV, Ye.F., professor, redaktor; KOSTYLEV, B.N., inzhener, redaktor; POVAROV, L.S., kandidat tekhnicheskikh nauk, redaktor; ULINICH, F.R., redaktor; KLORIK'YAN, S.Kh., otvetstvennyy redaktor; GLADILIN, L.V., redaktor;

(Continued on next card)

BEYLINA, TS.O. --- (continued) Card 2.

RUPPENEYT, K.V., redaktor; TERPIGOREV, A.M., glavnyy redaktor; BARABANOV, F.A., redaktor; BARANOV, A.I., redaktor; BUCHNEV, V.K., redaktor; GRAFOV, L.Ye., redaktor; DOKUKIN, A.V., redaktor; ZADEMIDKO, A.N., redaktor; ZASYAD'KO, A.F., redaktor; KRASNIKOVSKIY, G.V. redaktor; LETOV, N.A., redaktor; DISHIN, G.L., redaktor; MAN'KOVSKIY, G.I., redaktor; MEL'NIKOV, N.V., redaktor; ONIKA, D.G., redaktor; OSTROVSKIY, S.B., redaktor; POKROVSKIY, N.M., redaktor; POLSTYANOY, G.N., redaktor; SKOCHINSKIY, A.A., redaktor; SONIN, S.D., redaktor; SPIVAKOVSKIY, A.O., redaktor; STANCHENKO, I.K., redaktor; SUDOPLATOV, A.P., redaktor; TOPCHIYEV, A.V., redaktor; TROYANSKIY, S.V., redaktor; SHEVYAKOV, L.D., redaktor; BYKHOVSKAYA, S.N., redaktor izdatel'stva; ZAZUL'SKAYA, V.F., tekhnicheskiy redaktor; PROZOROVSKAYA, V.L., tekhnicheskiy redaktor.

[Mining; an encuclopedic handbook] Gornoe delo; entsiklopedicheskii spravochnik. Glav.red. A.M. Terpigorev. Chleny glav.red. F.A. Barabanov i dr. Moskva, Gos.nauchno-tekhn.izd-vo lit-ry po ugol'noi promysh]. Vol.1. [General engineering] Obshchie inzhenernye svedeniia. Redkollegiia toma S.Kh.Klorik'ian i dr. 1957. 760 p.
(Mining engineering) (MLRA 10:10)

BOKSHITSKIY, Ya. M.

DUBROV, N.F., kand. tekhn. nauk; MIKHAYLOV, O.A., kand. tekhn. nauk; FEL'DMAN, I.A.; DANILOV, A.M.; SOROKIN, P.Ya., kand. tekhn. nauk, starshiy nauchnyy sotrudnik; BUTAKOV, D.K., kand. tekhn. nauk, dots.; SOYFER, V.M.; LATASH, Yu.V., mladshiy nauchnyy sotrudnik; ZAMOTAYEV, S.P.; BEYTEL'MAN, A.I.; SAPKO, A.I.; PETUKHOV, G.K., kand. tekhn. nauk; YEDNERAL, F.P., kand. tekhn. nauk, dots.; LAPOTYSHKIN, N.M., kand. tekhn. nauk, starshiy nauchnyy sotrudnik; ROZIN, R.M.; NOVIK, L.M., kand. tekhn. nauk, starshiy nauchnyy sotrudnik; LAVRENT'YEV, B.A.; SHILYAYEV, B.A.; SHUTKIN, N.I.; GNUCHEV, S.A., kand. tekhn. nauk, starshiy nauchnyy sotrudnik; LYUDEMAN, K.F., doktor-inzh., prof.; GRUZIN, V.G., kand. tekhn. nauk; BARIN, S.Ya.; POLYAKOV, A.Yu., kand. tekhn. nauk; FEDCHENKO, A.I.; AGEYEV, P.Ya., prof., doktor; SAMARIN, A.M.; BOKSHITSKIY, Ya.M., kand. tekhn. nauk; GARNYK, G.A., kand. tekhn. nauk; MARKARYANTS, A.A., kand. tekhn. nauk; KRAMAROV, A.D., prof., doktor tekhn. nauk; TEDER, L.I.; DANILOV, P.M.

Discussions. Biul. TSNIICHM no.18/19:69-105 '57. (MIRA 11:4)

1. Direktor Ural'skogo instituta chernykh metallov (for Dubrov). 2. Direktor TSentral'nogo instituta informatsii chernoy metallurgii (for Mikhaylov). 3. Nachal'nik nauchno-issledovatel'skogo otdela osobogo konstruktorskogo byuro tresta "Elektropech'" (for Fel'dman). 4. Nachal'nik martenovskoy laboratorii Zlatoustovskogo metallurgicheskogo zavoda (for Danilov, A.M.). 5. Laboratoriya protsessov stalevareniya Instituta metallurgii Ural'skogo filiala AN SSSR (for Sorokin).

(Continued on next card)

DUBROV, N.P.---(continued) Card 2.
6. Ural'skiy politekhnicheskiy institut (for Butakov). 7. Starshiy inzhener Bryanskogo mashinostroitel'nogo zavoda (for Soyfer). 8. Institut elektrosvarki im. Patona AN URRS (for Latash). 9. Nachal'nik TSentral'noy zavodskoy laboratorii "Uralmashzavoda" (for Zamotayev). 10. Dnepropetrovskiy metallurgicheskiy institut (for Sapko). 11. Moskovskiy institut stali (for Yedneral). 12. TSentral'nyy nauchno-issledovatel'skiy institut chernoy metallurgii (for Gnuchev, Lapotyshkin). 13. Starshiy master Leningradskogo zavoda im. Kirova (for Rozin). 14. Institut metallurgii im. Baykova AN SSSR (for Novik, Polyakov, Garnyk). 15. Nachal'nik tekhnicheskogo otdela zavoda "Bol'shevik" (for Lavrent'yev). 16. Starshiy inzhener tekhnicheskogo otdela Glavspetsstali Ministerstva chernoy metallurgii (for Shilyayev). 17. Zamestitel' nachal'nika tekhnicheskogo otdela zavoda "Elektrostal'" (for Shutkin). 18. Freybergskaya gornaya akademiya, Germanskaya Demokraticheskaya Respublika (for Lyudeman). 19. Zaveduyushchiy laboratoriyey stal'nogo lit'va TSentral'nogo nauchno-issledovatel'skogo instituta tekhnologii i mashinostroyeniya (for Gruzin). 20. Starshiy master elektrostaleplavil'nykh pechey Uralvagonzavoda (for Barin). 21. Zamestitel' nachal'nika elektrostaleplavil'nogo tsekha zavoda "Sibelektrostal'" (for Fedchenko). 22. Zaveduyushchiy kafedroy metallurgii stali i elektrometallurgii chernykh metallov Leningradskogo politekhnicheskogo instituta (for Ageyev). 23. Zamestitel' direktora Instituta metallurgii im. Baykova AN SSSR, chlen-korrespondent AN SSSR (for Samarin).

(Continued on next card)

DUBROV, N.F.---(continued) Card 3.
24. Nachal'nik laboratorii TSentral'nogo nauchno-issledovatel'skogo instituta chernoy metallurgii (for Bokshitskiy). 25. Zaveduyushchiy kafedroy elektrometallurgii Sibirskogo metallurgicheskogo instituta (for Kramarov). 26. Nachal'nik elektrostaleplavil'nogo tsekha Kuznetskogo metallurgicheskogo kombinata (for Teder). 27. Nachal'nik elektrometallurgicheskoy laboratorii Kuznetskogo metallurgicheskogo kombinata (for Danilov, P.M.).
(Steel--Metallurgy)

SOV/133-58-6-15/33

AUTHORS: Bokshitskiy, Ya.M., Yemyashev, A.V., Zubko, A.M. and Filippycheva, M.M.

TITLE: The Influence of Vacuum Melting on the Quality of Steel (Vliyaniye vakuumnoy vyplavki na kachestvo stali)

PERIODICAL: Stal', 1958, Nr 6, pp 520 - 525 (USSR).

ABSTRACT: An investigation of the influence of vacuum melting on the quality of Kh27 and 18KhNVA steels is described. Vacuum melting was carried out in a 12 kg furnace previously described (Ref 5). The conditions of melting and heating of liquid metal, teeming temperature and the time of retention in the final vacuo were the same for all melts. As a charge, mild steel ingots smelted in the usual manner in a 30-kg high-frequency furnace were used. The pressures used were: 1 mm and 1/10 of a metre, $5\text{-}8 \cdot 10^{-3}$ mm and $5 \cdot 10^{-5}$ mm. The results of chemical gas analysis and impact strength of steel Kh27 smelted under normal pressure and in vacuo - Table 1. The impact strength of forged and hardened-in-water from 900 °C metal from all heats was low. In order to find factors determining the impact strength of Kh27 steel, a series of vacuo heats using electrolytic materials were carried out. The results obtained showed that apparently the main element

Card1/4 determining the impact strength is carbon. The influence of

the depth of vacuo on the composition of metal, the gas content and the content of admixtures in steel is shown in Tables 2 and 3 and Figure 1, respectively. The influence of depth of vacuo on the mechanical properties of forged and thermally treated Kh27 steel - Table 4; the dependence of impact strength of the steel smelted in vacuo on the carbon content - Figure 2 and on the gas content - Figure 3. It is concluded that: 1) valcuum melting of Kh27 steel is accompanied by some changes in its chemical composition due to the evaporation of such elements as manganese and silicon and due to reactions forming gaseous products; 2) The change in chemical composition depends on the depth of vacuo; 3) Valcuum melting gives the following effects: a) the reaction between oxygen and carbon is more efficient; the content of carbon decreases to thousandths of parts of 1%; the reaction of sulphur with oxygen is also more intensive; b) the content of gas in the deoxidised metal decreases by a factor of 3; c) it has no influence on the structure of the metal. 4) On valcuum melting of steel Kh27 with its subsequent heat treatment, its impact strength can be considerably increased (30-60 times); the highest effect on the impact strength has the content of carbon;

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when the latter is below 0.01%, the impact strength of steel reaches 15 - 18 kg/cm^2; 5) On valcuum melting from electrolytic materials, the technological properties of steel Kh27 depend on the content of carbon and silicon.
Steel 18KhNVA was made from a steel (C 0.19-0.20%) smelted from Sulinsk sponge iron. The experimental heats were carried out under normal pressure and a vacuo of 0.5 - 1 mm and 1.10^{-4} mm. The composition of steel %: C 0.14-0.21; Si 0.17-0.37; Mn 0.25-0.55; P, S $\leq$ 0.035; W 0.80-1.20; Cr 1.35-1.65; Ni 4.00-4.50%. The gas content of metal from experimental heats in cast (nominator) and forged (denominator) state - Table 5; the amount of non-metallic inclusions - Table 6; mean indices of mechanical properties of longitudinal specimens from the experimental heats - Table 7. It is concluded: 1) That vacuum melting of 18KhNVA steel decreases the content of nitrogen and oxygen in steel: a) heats made at a vacuo of 10^{-4} mm contained many times less nitrogen (0.0020 - 0.0050%) than heats made under normal pressure (0.0030 - 0.0109%); the influence of the depth of vacuo on nitrogen content was not detected; b) the content of oxygen in vacuo

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heats at a pressure of 10^{-2} mm was on average 5 times smaller (0.0010 - 0.0028%) than in metal from heats made under normal pressure (0.0051 - 0.0140%); further decrease of pressure to 10^{-3} - 10^{-4} mm lead to a further decrease in the oxygen content (up to 0.0003 - 0.0005%). 2) Metal from vacuo heats contained 5-10 times less of non-metallic inclusions (0.0012 - 0.0058%) than the usual heats from industrial arc furnaces (0.0168 - 0.0281%) and possessed higher values for relative elongation (approximately by 40%) and impact strength (by 7 kg/cm^2). There are 3 figures, 7 tables and 5 references, 3 of which are Soviet, 1 French and 1 English.

ASSOCIATION: TsNIIChM

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1. Vacuum furnaces--Effectiveness 2. Steel--Production
3. Steel--Mechanical properties

PHASE I BOOK EXPLOITATION SOV/5009

Bokshitskiy, Ya. M., and M. M. Filippycheva

Sposoby snizheniya vesa pribyl'noy chasti slitka (Methods of Reducing the Weight of Ingot Riser) Moscow [VINITI], 1959. 44 p. Errata slip inserted. 4,000 copies printed.

Sponsoring Agency: Gosudarstvennyy nauchno-tekhnicheskiy komitet Soveta Ministrov SSSR, Akademiya nauk SSSR, and Vsesoyuznyy institut nauchnyy i tekhnicheskoy informatsi.

Tech. Ed.: G. A. Shevchenko

PURPOSE: This booklet is intended for technical personnel of steelmaking plants.

COVERAGE: The booklet reviews various methods of heating ingot risers and explores possibilities of bringing the shrinkage cavity into the riser. Using hot tops with refractory or exothermic lining and covering the riser surface with a heat-insulating material or with exothermic compounds are discussed. Methods of reducing the weight of the ingot riser are compared, and the

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authors conclude that the application of an exothermic lining to hot tops produces the best results. No personalities are mentioned. There are 28 references: 15 Soviet, 10 English, 2 German, and 1 Czech.

TABLE OF CONTENTS:

BOKSHITSKIY, Ya.M.; FILIPPYCHEVA, M.M.; SHEVCHENKO, G.A., tekhn.red.

[Ways to reduce the weight of ingot riser heads] Sposoby snizheniia vesa pribyl'noi chasti slitka. Moskva, Vses.in-t nauchn.i tekhn.informatsii, 1959. 41 p. (MIRA 13:10)
(Steel ingots)

BORODULIN, Georgiy Mikhaylovich; BOKSHITSKIY, Ya.M., red.; ZINGER, S.L., red.izd-va; DOBUZHINSKAYA, L.V., tekhn.red.

[Use of oxygen in the electrometallurgy of steel] Primenenie kisloroda v elektrometallurgii stali. Moskva, Gos.nauchno-tekhn.izd-vo lit-ry po chernoi i tsvetnoi metallurgii, 1959. 84 p. (MIRA 12:8)

(Steel--Electrometallurgy)
(Oxygen--Industrial applications)

LEYKIN, Veniamin Yefimovich; SAKHARUK, Pavel Aleksandrovich. Prinimal uchastiye MORGULEV, S.A. BOKSHITSKIY, Ya.M., red.; ROZENTSVEYG, Ya.D., red.izd-va; MIKHAYLOVA, V.V., tekhn.red.

[Electrometallurgy of steel and ferroalloys] Elektrometallurgiia stali i ferrosplavov. Izd.2., perer. Moskva, Gos.nauchno-tekhn. izd-vo lit-ry po chernoi i tsvetnoi metallurgii, 1960. 600 p. (MIRA 14:1)

(Steel--Electrometallurgy)
(Iron alloys--Electrometallurgy)

BOKSHITSKIY, Ya.M.

S/133/60/000/007/007/016

AUTHORS: Voinov, S.G., Candidate of Technical Sciences; Korneyenkov, A.N., Engineer; Petrov, A.K., Engineer; Bokshitskiy, Ya.M., Engineer; Markelov, A.I., Engineer; Shalimov, A.G., Candidate of Technical Sciences; Kosoy, L.F., Engineer; Chekhomov, O.M., Engineer; Khasin, G.A., Engineer

TITLE: The Refining of Alloy Steels by Molten Synthetic Slags

PERIODICAL: Stal', 1960, No. 7, pp. 611 - 618

TEXT: Experiments of refining alloy steels by molten slags in the ladle were made to improve this process. 315 experimental castings were carried out in 10-t and 20-t basic arc furnaces, with ball bearing, structural and stainless steels. The slag was prepared in a 10-t arc furnace (with a 2500 kva transformer) from a mixture of 95 kg lime and 80 kg commercial grade alum earth; the synthetic slag poured into the ladle was about 5 - 6% of the metal weight. Two kinds of slags were used, one for ball bearing steel (A = A) and one for structural and stainless steel (B = B) with the following composition (the nominators indicate the values before, the denominators after the treatment of the metal):

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Slag	CaO	Al_2O_3	SiO_2	MgO	FeO
A	53.3 49.5	44.4 42.2	1.42 3.54	1.22 3.46	0.18 0.25
B	53.6 50.4	43.8 41.5	1.31 4.32	1.46 3.83	0.18 0.23

The temperature of the slag varied between 1,650°C and 1,750°C. The electric power used in preparing the slag was 150 kwh per 1 ton of steel, this value, however, will not be higher than 90 kwh/ton when using furnaces specially designed for this purpose. The electrode consumption in the smelting furnace amounted to 1.3 kg/ton steel. In the experiments the following steel types were used: ШХ15 (ShKh15), ШХ15СГ (ShKh15SG), С65А (S65A), 30ХГСА (30 KhGSA), 30ХГСНА (30KhGSNA), 40ХНМА (40KhNMA), and У7А-У8А (in 20-t electric furnaces) and 38ХМЮА (38KhMYuA), 35ХЮА (35KhYuA), 18ХНВА (18KhNVA), 12Х2Н4А (12Kh2N4A), 12ХН3А (12KhN3A), СХ8 (SKh8), 1Х13 (1Kh13) and 1Х18Н9Т (1Kh18N9T) (in 10-t electric furnaces). Several modifications of refining are described: under basic and chamotte slag; with different amounts of ferrosilicon and aluminum; with and without deoxidation of the metal and with varying dura-

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tion of the process. Generally it was found that the refining time was reduced by 45 - 50 min for all steel types and the output of the electric furnace could be increased by 10 - 15%. The macrostructure and the fracturing of the tested steel types were found to be satisfactory. The sulfur content decreased to 0.005 - 0.007%, with an initial sulfur content of 0.040%. The most considerable desulfuration by synthetic slag was obtained in ball bearing steels (0.003 -0.006%). whereas desulfuration was less intensive in structural steels, in which the sulfur content was 0.001 - 0.002% higher than in ball bearing steels, but still 40 - 50% less than in the conventional type of this kind of steel, with 0.011 - 0.012% S content. It was found that by refining with synthetic slag the amount of sulfide and oxide inclusions could also be reduced. Structural steels of high purity (with regard to inclusions) can be produced by refining with basic slags and when applying diffusion deoxidation. On account of the decrease of the sulfur content and non-metallic inclusions, the mechanical properties, in particular the impact strength and the relative shrinking, are considerably improved in structural and stainless steels. The best results were obtained for the 30KhGSA steels 5.2 kg-m/cm^2 and 43.5%, respectively. These values

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are 1.6 times and twice higher than those for the conventional type of this steel. It was also found that the anisotropy of the metal properties decreased: the relation of values for relative shrinkage of transverse and longitudinal specimens increased from 0.62 (of the conventional metal) to 0.79 and 0.86 on the average for the test metal, observed in two variants of the process (variant I and II), whereas the relation of the values for impact strength was raised from 0.56 to 0.71 and 0.74, respectively. It was found that by processing open-hearth steel and converter steel with synthetic slag, according to the method described, the properties of these steel types can be raised to the level of those of electrosteel. The article contains the principal technological data for the test steels, the changes of the sulfur content in the metal and the synthetic slag in the various modifications of refining and the indices of mechanical properties of the structural and stainless steel specimens. There are 6 sets of graphs, 1 diagram, 3 tables and 4 references: 1 Soviet, 1 Swedish and 2 English.

ASSOCIATION: Ukrainskiy institut metallov (Ukrainian Metal Institute)

Card 4/4

VOINOV, S.G.; KOSOY, L.F.; SHUMOV, M.M.; SHALIMOV, A.G.; CHEKHOMOV, O.M.; ANDREYEV, T.B.; AFANAS'YEV, S.G.; KALINNIKOV, Ye.S.; Prinimali uchastiye: KORNEYENKOV, A.N.; GURSKIY, G.V.; BOKSHITSKIY, Ya.M.; PETROV, A.K.; MOKHIR, Ye.D.; KOLYASNIKOVA, R.I.; KHASIN, G.A.; DANILIN, V.P.; PLEKHANOV, P.S.; MAZUN, A.I.; MARKIN, A.A.

Refining converter steel in the ladle with liquid synthetic slag. Stal' 22 no.3:226-232 Mr '62. (MIRA 15:3)
(Steel—Metallurgy)

KOMAR, V.; BOKSHITSKIY, Ya.

Supply of KRU-3 equipment with power registering units. Prom. energ. 17 no.12:47 D '62. (MIRA 17:4)

1. Energosbyt Stavropol'energo.

SOV/126-6-6-12/25

AUTHORS: Bokshteyn, B. S., Magidson, I. A. and Svetlov, I. L.

TITLE: On Diffusion in the Bulk and at the Boundaries of Grains (O diffuzii v ob"yeme i po granitsam zeren)

PERIODICAL: Fizika metallov i metallovedeniye, 1958, Vol 6, Nr 6, pp 1040-1052 (USSR)

ABSTRACT: Fisher (Ref.9) was the first to give a theoretical analysis of superposition and interaction of grain-boundary and bulk diffusion in a polycrystal. He discusses diffusion in a semi-infinite crystal with grain boundaries perpendicular to the crystal surface (Fig.1). A grain boundary was represented by a "slot" of thickness δ. The coefficients of diffusion at the boundary and in the bulk of a grain were D_2 and D_1 respectively. It was assumed that D_2 is $\gg D_1$ and therefore the vertical component of the bulk diffusion was neglected; diffusion was taken to occur predominantly at right angles to the boundary. The concentration of the diffusing substance at the surface of the sample was assumed to be constant and equal to c_0; D_1 and D_2 were independent of concentration. Solving differential equations for diffusion along the boundaries and in the bulk of grains,

Fisher found a simple expression for c_{06} which is the concentration of the diffusing substance in the grain. The "slot" model described by Fisher was developed further by Golikov and Borisov (Ref.12), who estimated the limits of applicability of Fisher's solution. The "slot" model is only a rough approximation. It describes diffusion in a single boundary and therefore cannot allow for dimensions of grains and interaction between grain boundaries. This model is not suitable for grains of small size, for small ratios of the diffusion coefficients and for long diffusion times. It cannot be used at all to describe diffusion in mosaic blocks. The authors describe a different diffusion model. They regard a polycrystal as an assembly of grains in the form of spheres (Fig.2). They assume that the packing is somewhat denser than for perfect spheres, since in general the grain shapes are not spherical. The grain boundaries are treated as a separate phase with its own properties. It is assumed that at a certain distance r_o from the centre of each grain there

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is a discontinuous change of concentration and diffusion coefficient. The diffusing substance is distributed between the two phases, the boundaries and the bulk of grains. The model is similar to those used in heat and mass transfer theories for granular material. The concentration of the diffusing substance at the grain boundaries is taken to be a function of the depth of penetration x and time of diffusion t :

$$u(x, t) = \iint u(x, y, z, t)\, dydz \quad .$$

The concentration of the diffusing substance in the bulk of the grains is assumed in the form:

$$w(x, r, t) = \iint w(x, y, z, r, t)dydz$$

where r is the radial distance in a grain. Diffusion in spherical grains of mean radius r_o is then given by Eq.(4) and diffusion at the grain boundaries is given by Eq.(5). The latter equation introduces two new quantities: H, which is the portion representing "free" boundaries in the total area of boundaries, and η is the boundary area per

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unit volume. The authors show that for non-spherical grains $\eta/H = 2/a_0$, where a_0 is the smallest separation between grains. The diffusion equations with their initial and boundary conditions can be then written as follows:

$$\frac{\partial w}{\partial t} = D_1\left(\frac{\partial^2 w}{\partial r^2} + \frac{2}{r}\frac{\partial w}{\partial r}\right), \tag{9}$$

$$\frac{\partial u}{\partial t} = D_2\frac{\partial^2 u}{\partial x^2} - \frac{2}{a_0}D_1\left.\frac{\partial w}{\partial r}\right|_{r=r_0}, \tag{10}$$

$$u(0, t) = u_0, \tag{11'}$$

$$u(x, 0) = 0, \tag{11''}$$

$$w(x, r_0, t) = \gamma_0 u(x, t), \tag{12'}$$

$$w(x, r, 0) = 0. \tag{12''}$$

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Spherical symmetry of the function $w(x, r, t)$ is assumed in the above equations, which means that they are applicable in the case of small grains, long diffusion times and large ratios D_2/D_1 . The authors introduce non-dimensional parameters:

$$\rho = \frac{r}{r_o} ; \quad \tau = \frac{D_1 t}{r_o^2} ; \quad \xi = \frac{x}{r_o} ; \quad \alpha = \frac{D_2}{D_1}$$

and solve Eqs.(9) and (10), using the operational Laplace method (Appendix 1). The solution is given by:

$$\frac{\bar{u}}{u_o} = \frac{1}{p} \exp\left(- \sqrt{\frac{p + \gamma \frac{2}{a_o} K(p)}{\alpha}} \xi \right) \qquad (16)$$

where:

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$$K(p) = \sqrt{p}\,\frac{\exp(\sqrt{p}) + \exp(-\sqrt{p})}{\exp(\sqrt{p})-\exp(-\sqrt{p})} - 1 = \sqrt{p}\ \mathrm{cth}\sqrt{p} - 1\ , \quad (17)$$

$$\bar{c} = \gamma\bar{u}\ \frac{\exp(\sqrt{p}\rho) - \exp(-\sqrt{p}\rho)}{\exp(\sqrt{p}) - \exp(-\sqrt{p})}\ , \quad (18)$$

and $\gamma = \gamma_o r_o$. The solution of Eq.(16) is rewritten in terms of variables used in Eqs.(9-12") and simplified for certain special cases. The solution was used to calculate the diffusion coefficients using the experimental data of Bokshteyn et al (Ref.5). These diffusion coefficients are given in a table on p 1045 together with the results of calculations using Fisher's method and two other methods. The "spherical" model used by the authors may be used to describe diffusion in powders, eutectic-type two-phase mixtures, and between mosaic blocks. The paper is entirely

On Diffusion in the Bulk and at the Boundaries of Grains

theoretical. There are 2 appendices, 1 table and 14 references; 6 of the references are Soviet and 8 English.

ASSOCIATION: Moskovskiy institut stali (Moscow Steel Institute)

SUBMITTED: June 23, 1956.

Card 7/7

5(2), 21(8) SOV/32-24-11-2/37

AUTHORS: Kryukov, S. N., Bokshteyn, B. S., Degal'tseva, T. I., Zhukhovitskiy, A. A.

TITLE: The Analysis of Compound Systems by the Method of β-Radiation Reflection (Analiz slozhnykh sistem metodom otrazheniya β-izlucheniya)

PERIODICAL: Zavodskaya Laboratoriya, 1958, Vol 24, Nr 11, pp 1305-1308 (USSR)

ABSTRACT: The discovery of Mueller (Myuller) (Ref 2), that the reflex effect is determined by the central charge does not prove to be true in a number of cases. In order to analyze ternary and more complex systems composed of components with various nuclear charges the method of β-radiation reflection was further developed. Measurement of the reflected radiation after it has passed through filters of various thicknesses is suggested by the authors. Using this method the three-component system Fe - Mo - W was analyzed, and the iron content of ores was determined. The iron-molybdenum-tungsten mixture was prepared from chemically pure powders of these elements. The measuring apparatus was previously described (Ref 3). Sr^{90} and Y^{90} mix-

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The Analysis of Compound Systems by the Method of β-Radiation Reflection

tures were used as radiation sources. Using a thin aluminum filter it was observed that the reflected η_2 depends to a great extent upon the composition. With thicker filters the reflected η_1 is determined only by molecules of moderate weight. A graphical determination based upon the reflection as a function of the iron content at a given molecular weight (thin aluminum filter, 0.15 mm) together with the results using a thicker aluminum filter make possible a determination of the composition of a mixture. Measurements on a series of ores and artificial mixtures (ordered from "Gikyuzhruda") showed that the reflection through thin filters is insufficient as a basis for the analysis of ores. The values of η_1 and η_2 must first be determined, and then from the standard curve formed from the intersection of the η_2 straight line with the straight line of the constant η_1 the iron content can be determined.

There are 5 figures and 3 references, 2 of which are Soviet.

The Analysis of Compound Systems by the Method of β-Radiation Reflection SOV/32-24-11-2/37

ASSOCIATION: Moskovskiy institut stali im. I. V. Stalina (Moscow Steel Institute imeni I. V. Stalin)

Card 3/3

BOKSHTEYN, B.S.; GUDKOVA, T.I.

Evaluating factors determining changes in diffusion mobility during deformation. Izv.vys.ucheb.zav.; chern.met. no.5: 108-114 '60. (MIRA 13:6)

1. Moskovskiy institut stali.
(Diffusion coatings) (Dislocations in metals)

86701

24.7700 1043, 1143, 1559 S/180/60/000/006/019/030
E111/E335

AUTHORS: Belashchenko, D.K., Bokshteyn, B.S. and Zhukhovitskiy, A.A. (Moscow)

TITLE: Electrodiffusion Potential in Metals

PERIODICAL: Izvestiya Akademii nauk SSSR, Otdeleniye tekhnicheskikh nauk, Metallurgiya i toplivo, 1960, No. 6, pp. 109 - 111

TEXT: The authors briefly discuss differences between movement of components in alloys and electrolytes under the influence of a direct current. In a report on work carried out at the Moskovskiy institut stali (Moscow Steel Institute), Belashchenko and Zhukhovitskiy previously formulated the existence of a diffusion potential in a binary alloy. The object of the present work is the experimental verification of the existence of a diffusion gradient of potential in metals. To obtain a reasonably large value of the gradient, it was decided to use liquid metals. The system Pb-Sn at 350 - 450 °C was chosen. To measure the potential difference, a specimen (a vertical capillary with the two liquid metals)

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Electrodiffusion Potentials in Metals

was connected in series with other specimens and a galvanometer of 14.3 ohm internal resistance and 30 x 10^{-9} A/division maximum sensitivity. Convection was not a significant factor in the experiments. Fig. 2 shows the diffusional potential difference, $\Delta\varphi \cdot 10^{-6}$V, as a function of time, τ, hrs (zero time corresponds to attainment of desired temperature) at 375 °C. The initial value of 5.0 $\pm$ 1.5 μV (the lead being more positive) stays constant for some hours and then decreases to zero (the step on the isotherm shown is not significant); it agrees in order of magnitude with that theoretically expected. Values for the diffusion coefficient and activation energy found from results of these experiments agree with published values (Ref. 1). Care was taken to prevent interference by thermoelectric e.m.f., whether due to furnace conditions or differences in mutual heats of solution and absence of these was verified. The authors point out the suitability of the investigated effect for

86701

S/180/60/000/006/019/030
E111/E335

Electrodiffusion Potentials in Metals

determination of molecular characteristics, such as effective charge and mobility of metal ions. They recommend its investigation on systems where higher values are to be expected, e.g. semiconductors.
There are 2 figures and 2 Soviet references.

SUBMITTED: August 26, 1960
Card 3/3

18.7500 4016, 1145, 1413

S/181/61/003/003/006/030
B102/B214

AUTHORS: Pao-hsueh-hsin, Bokshteyn, B. S., Zhukhovitskiy, A. A.

TITLE: Diffusion in heterophase systems

PERIODICAL: Fizika tverdogo tela, v. 3, no. 3, 1961, 723-728

TEXT: The present paper considers theoretically and gives the results of experiments on the self-diffusion of iron in two-phase Fe-Cu alloys. The object of the investigation was to study the diffusion in the heterophase region of a multiphase alloy in order to determine the dependence of the effective diffusion coefficient on the composition of the alloy. It is of interest primarily due to the fact that the formulas derived theoretically differ from one another. The self-diffusion coefficient of Fe^{59} in the system Fe-Cu was determined at 900-1000°C by the method of the thick layer. At these temperatures, the alloys were mixtures of the γ(~5% Cu) and the ε-phase (~2.5% Fe). The pure phases were also studied. The starting materials were electrolytic copper remolten in a vacuum and electrolytic iron powder. The chemically determined compositions of the samples are given in Table 1. The grain sizes were determined for all the samples (Fe~0.01 mm, Cu smaller).

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Diffusion in ...

Radioactive iron was electrodeposited on the surface of the samples which were then heated in a vacuum (10^{-4} mm Hg) for 100-150 hours. The decrease of the β-activity was measured by an end-window counter. The self-diffusion coefficients were determined from the kinetic curves obtained. The results ($\pm 15\%$) are collected in Table 2. The principal results may be summarized as follows: If to the "slow" γ-phase is added the ε-phase which has a much larger diffusion coefficient (16-50 times), the effective diffusion coefficient of the alloy increases only slightly. An addition of 36% ε-phase at 1000°C increases the self-diffusion coefficient of iron to less than its double. If, on the other hand, to the "fast" ε-phase is added the γ-phase, the effective diffusion coefficient diminishes considerably. By the addition of 9% γ-phase D_{eff} falls to half the value (at 1000°C), and when adding 43%, to less than one-sixth. The situation is quite different at 900°C. Here, the addition of 9% γ-phase suffices to decrease D_{eff} to less than one-third. Since the theoretical formulas available in the literature do not provide a satisfactory description of the experimental facts, a formula for the diffusion coefficient of the alloy for the case of small grain sizes and long diffusion times based on a more appropriate model is first obtained:

Card 2/5

Diffusion in ...

$D_{eff} = \frac{D_2}{(1+\frac{2}{3}\frac{N_1}{N_2})(1+\frac{1}{45}\frac{r_o^2}{D_1 t})}$. N_1, N_2 and D_1, D_2 are the volume concentrations and diffusion coefficients, respectively, of two components; r_o is the grain size of the γ-phase. This formula, however, does not agree with the experimental results; so the model is altered, and the final formula obtained is: $\frac{D_{eff}-D_1}{D_{eff}+2D_1} = N_2(\frac{D_2-D_1}{D_2+2D_1})$ (7). The subscript 1 refers to the γ-phase and 2 to the ϵ-phase. Putting $x = D_{eff}/D_2$ and $a = D_1/D_2$ the formula is $\frac{x-a}{x+2a} = N_2(\frac{1-a}{1+2a})$, and when $N_2 \ll 1$, $dx/dN_2 \approx 3D_1/D_2$; when $N_2 \approx 1$, $dx/dN_2 \approx 3D_1/N_1^2 D_2$. Formula (7) gives an excellent description of the experimental results. There are 2 figures, 2 tables, and 9 references: 6 Soviet-bloc and 3 non-Soviet-bloc.

ASSOCIATION: Moskovskiy institut stali im. I. V. Stalina (Moscow Steel Institute imeni I. V. Stalin)

Card 3/5

20781
S/181/61/003/003/006/030
B102/B214

Diffusion in ...

SUBMITTED: April 7, 1960

Legend to Table 1: 1) Number of sample. 2) % by weight. 3) % by volume.

(1) Номер образца	Вес. % (2)		Вес. % (2)		Объем. % (3)	
	Ca	Fe	α	γ	α	γ
1	5.0	95.0	0	100	0	100
2	9.9	90.1	5	95	5	95
3	19.1	80.9	15	85	13.5	86.5
4	40.9	59.1	39	61	36	64
5	50.4	49.6	49	51	46	54
6	60.8	39.2	60	40	57	43
7	79.8	20.2	81	19	79	21
8	90.0	10 0	92	8	91	9
9	97.6	2.4	100	0	100	0

Card 4/5

Diffusion in ...

Legend to Table 2: 1) Number of sample. 2) % by volume. 3) D_{eff}.

Table 2

① Номер образца	② N_{Zn} объемн. %	900° C			1000° C		
		m	$D_{эфф.}$ ③	$\frac{D_{эфф.}}{D_i}$	m	$D_{эфф.}$	$\frac{D_{эфф.}}{D_i}$
1	0	720	$0.50 \cdot 10^{-12}$	0.019	276	$3.97 \cdot 10^{-12}$	0.055
2	5	—	—	—	236.3	$4.29 \cdot 10^{-12}$	0.070
3	13.5	584	$0.75 \cdot 10^{-12}$	0.029	210.5	$5.84 \cdot 10^{-12}$	0.095
4	36.0	487.5	$1.08 \cdot 10^{-12}$	0.042	200.0	$6.45 \cdot 10^{-12}$	0.105
5	46.0	397.0	$1.63 \cdot 10^{-12}$	0.063	—	—	—
6	57.0	328.0	$2.37 \cdot 10^{-12}$	0.091	166.6	$9.28 \cdot 10^{-12}$	0.151
7	79.0	232.0	$4.75 \cdot 10^{-12}$	0.183	116.6	$18.9 \cdot 10^{-12}$	0.308
8	91.0	175.0	$8.35 \cdot 10^{-12}$	0.322	87.0	$34.0 \cdot 10^{-12}$	0.554
9	100	148.6	$22.4 \cdot 10^{-12}$	1.0	64.7	$61.3 \cdot 10^{-12}$	1.0

Card 5/5

BELASHCHENKO, D.K.; BOKSHTEYN, B.S. (Moscow)

Theory of electrical transport. Multicomponent metallic systems. Part 2. Zhur.fiz.khim. 35 no.10:2228-2233 O '61. (MIRA 14:11)
(Electrochemistry) (Systems (Chemistry))

24.7000

S/181/62/004/007/005/037
B102/B104

AUTHORS: Bokshteyn, B. S., Belashchenko, D. K., and Zhukhovitskiy, A.A.

TITLE: Surface diffusion study in powders by the method of the electro-diffusion potential

PERIODICAL: Fizika tverdogo tela, v. 4, no. 7, 1962, 1728 - 1734

TEXT: Owing to the smallness of the diffusion current it is difficult to study surface diffusion experimentally. A new and simpler method is suggested, based on electric measurements. The activation energy of surface diffusion can be determined from the temperature dependence of the electro-diffusion potential. This potential was measured, in the range 210 - 310°C, for diffusion of tin into pressed nickel powder. That substance and temperature interval were chosen because the volume diffusion coefficient for them is less than 10^{-20} cm^2/sec, so that virtually no tin penetrates into the Ni grain volume. The mean grain size was 10^{-2}cm. The grains were porous (10 volume %, pore size 10^{-5} cm), the pressed samples (cylinders of 10 mm diameter and 5 mm height) having porosity of about 45%. The

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Surface diffusion study ...

measurements were made at 210, 240, 270 and 310°C. Temperature dependence of the electrodiffusion potential, that of the diffusion coefficients, and the dependence of the Sn concentration on the penetration depth are given graphically and numerically. The activation energy of the Sn surface diffusion was Q=12,000 cal/g-at, the range of error around 20%. Control measurements were carried out with radioactive isotopes ($Sn^{113/123}$). The initial activity of the tin foil was 50,000 pulses/min, the penetration depth into the grain volume determined from the activity was about 1 Å, Q = 11,000 cal/g-at. The penetration depth, x, is proportional to $\sqrt{Dt}$ (where D is the diffusion coefficient) and , if $x \ll 2\sqrt{Dt}$, then $c/c_0 = 1 - x/\sqrt{\pi Dt}$; or, since c_0 is unknown, $\ln c/c_0 \approx -x/\sqrt{\pi Dt}$; log c plotted versus x gives straight lines with the angle of inclination α. If $\alpha \ll 1$, then $D = 0.19/\pi t \tan^2 \alpha$. Q=11,000 cal/g-at is found from the slope of the straight line $\log D = f(1/T)$, which is in good agreement with the value obtained from electrodiffusion potential measurements. The measurements also show that surface diffusion takes place not only on the surface but also in a layer having a thickness of ≈250 Å which considerably exceeds that of the

Card 2/3

S/181/62/004/007/005/037
B102/B104

Surface diffusion study ...

lattice constant. There are 3 figures and 3 tables.

ASSOCIATION: Moskovskiy institut stali (Moscow Steel Institute)

SUBMITTED: June 22, 1961 (initially), January 18, 1962 (after revision)

Card 3/3

S/032/63/029/004/005/016
A004/A127

AUTHORS: Grigor'yev, G.A., Bokshteyn, B.S.

TITLE: Determining the diffusion coefficient in metals by the electric transfer method

PERIODICAL: Zavodskaya laboratoriya, no. 4, 1963, 446 - 447

TEXT: To eliminate the deficiencies of the existing methods of determining the diffusion coefficients, in which a difference is made between initial and boundary conditions, the authors suggest a method of calculating the diffusion coefficients in metals on the basis of the data obtained by electric transfer. If DC is passed through a homogeneous metal alloy, a directional transfer of the alloy constituents is taking place and a concentration gradient originates. The gradient magnitude along the transfer direction is determined only by the diffusion coefficient D and effective charge z of the ions of the mixture constituents. The authors present the diffusion equation and the appropriate derivations for calculating the diffusion coefficient. There is 1 figure.

ASSOCIATION: Moskovskiy institut stali i splavov (Moscow Institute of Steel and Alloys)

Card 1/1

S/032/63/029/004/007/016
A004/A127

AUTHORS: Guglya, V.G., Chiang P'eng-Ch'ei, Bokshteyn, B.S., Zhukovitskiy, A.A.

TITLE: On the practicability of the Müller relation for the reflection of β-particles from synthetic mixtures.

PERIODICAL: Zavodskaya laboratoriya, no. 4, 1963, 449 - 453

TEXT: The detailed investigations carried out by Müller (Anal. Chem., 29, 6, 969, 1957) on reflections from a great number of chemical compounds revealed that this reflection is determined by some mean charge $\bar{Z}$. The authors conducted investigations to further elucidate the factors determining the reflection from multicomponent systems. It is shown that the intensity of β-radiation reflection is determined by the mean charge of the chemical compound or mechanical mixture; therefore, an analysis of multicomponent systems as to the content of some or even one of the constituents is impossible under general conditions. Moreover, it was found that the intensity of the reflected radiation depends also on the fractionating composition of the powder. The authors describe their tests in detail, which

were carried out with the powders of pure metals, chemical compounds and synthetic binary and ternary mechanical mixtures. They point out that only for systems of micro-nonhomogeneity it is possible to determine the composition of multicomponent systems using the method described. There are 5 figures and 4 tables.

ASSOCIATION: Moskovskiy institut stali i splavov (Moscow Institute of Steel and Alloys)

BOKSHTEYN, B.S.

Diffusion potential in metals and electrolytes. Izv. vys. ucheb. zav.; chern. met. 6 no.9:133-135 '63. (MIRA 16:11)

1. Moskovskiy institut stali i splavov.

ACCESSION NR: AP4013303 S/0032/64/030/002/0186/0190

AUTHORS: Rotin, V. A.; Belashchenko, D. K.; Bokshteyn, B. S.; Zhukhovitskiy, A. A.

TITLE: Method of determining electron diffusion potentials in binary melts of metals

SOURCE: Zavodskaya laboratoriya, v. 30, no. 2, 1964, 186-190

TOPIC TAGS: diffusion potential, electron diffusion, eutectic diagram, glass capillary, quenching oil bath, metallic melt

ABSTRACT: The electron diffusion in two types of alloys has been determined: alloys with simple eutectic diagrams and slight departures from ideal solutions (Pb-Sn, Bi-Sn, Bi-Cd) and alloys with fixed chemical composition but with large departures from laws of ideal solutions (Na-Tl and Bi-Te). The two metals were placed in a glass capillary and separated by means of 1-2 mm molybdenum solder. The capillary was placed in a quenching oil bath to keep the thermal emf of both metallic melts identical. The resulting diffusion potential was measured using a Gerts type 167300 high-sensitivity galvanometer with low input resistance. For large specimen impedances an M-95 galvonometer was used. The measurements indicated

Card 1/2

ACCESSION NR: AP4013303

a wide range of potential outputs, from a minimum of 5 μ kv for Pb-Sn to 100 μ kv for Na-Tl and Bi-Te systems. Orig. art. has: 4 figures, 3 tables, and 2 formulas.

ASSOCIATION: Moskovskiy institut stali i splavov (Moscow Institute of Steels and Alloys)

SUBMITTED: 00	DATE ACQ: 26Feb64	ENCL: 00
SUB CODE: ML	NO REF SOV: 005	OTHER: 001

Card 2/2

GRIGORYAN, V.A.; BOKSHTEYN, B.S.; BODRETSOVA, L.B.

Role of the gaseous phase with diffusion of phosphorus in molten oxides. Izv. vys. ucheb. zav.; chern. met. 8 no.5: 9-11 '65. (MIRA 18:5)

1. Moskovskiy institut stali i splavov.

ACC NR: AT6016344 (N) SOURCE CODE: UR/0000/65/000/000/0022/0029

AUTHORS: Bokshteyn, S. Z.; Bokshteyn, B. S.; Zhukhovitskiy, A. A.; Kishkin, S. T.; Nechayev, Yu. S.

ORG: none

63

B+1

TITLE: Relaxation method for the study of point defects in the crystal lattice of metals

SOURCE: AN UkrSSR. Podvizhnost' atomov v kristallicheskoy reshetke (Mobility of atoms in crystal lattice). Kiev, Izd-vo Naukova dumka, 1965, 22-29

TOPIC TAGS: metal crystal, crystal lattice, ~~lattice defect~~, crystal lattice defect, ~~aluminum~~ electric resistance

ABSTRACT: A relaxation method for the study of point defects in metal crystal lattices is presented. The proposed method is particularly suited for the separate determination of the activation energies of vacancy formation Q_f, and vacancy mobility Q_m in metal crystal lattices. The method is based on the determination of the vacancy relaxation time as a function of the temperature

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$$\left.\begin{aligned} \nu_B &= Z\nu_D \exp(S_m/R)\exp(-Q_m/RT) \\ l^2 &= 4\int_0^{\tau} D_B dt \\ D_B &= \frac{1}{6}\nu_D \delta^2 \exp(S_m/R)\exp(-Q_m/RT) \\ \tau_T &= \frac{3}{2}\cdot\frac{l^2}{\delta^2\nu_D}\exp(-S_m/R)\exp\left(\frac{Q_m}{RT}\right) \end{aligned}\right\};$$

where ν_B is the number of vacancy jumps per second, Z is the coordination number, ν_D is Debye frequency, S_m is entropy of activation for vacancy mobility, l is distance between sources and sinks of vacancies, D_B is diffusion coefficient of vacancies, δ is lattice constant, and n is the number of vacancy jumps during time τ_T. The relaxation time τ_T is determined by measuring the electrical resistance of a metal specimen as a function of time and temperature when the specimen is subjected to rapid heating. The changes in temperature ΔT_2, ΔT_3, etc, corresponding to changes in resistance ΔR_2, ΔR_3, etc for corresponding rates of heating ϑ_2, ϑ_3, etc, are obtained graphically (see Fig. 1). From these τ_T follows as

$$\tau_T = \frac{\Delta T_2}{\text{m. point } \upsilon_2} = \frac{\Delta T_3}{\upsilon_3},$$

ACC NR: AT6016344

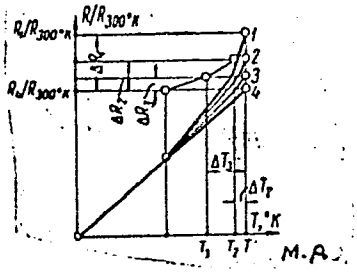

Fig. 1. Temperature dependence of the electrical resistance of metals for different rates of heating. 1 - lattice with equilibrium vacancies concentration, small heating rate; 4 - lattice without vacancies, large heating rate; 2, 3 - intermediate curves.

and Q_m from $\tau_r = A \exp(Q_m/RT)$. The value of Q_f is derived from a graph of $\ln \frac{\Delta R}{R}$ vs $\frac{1}{T}$. The method was tested on aluminum specimens, and a schematic of the experimental installation is presented. It was found that the relaxation time for Al at the melting point was 1.9×10^{-2} sec and $Q_f = 17 \pm 4$ kcal/mole. A variation of the above method affords a study of the kinetics for the reestablishment of equilibrium vacancies concentrations. This method is based on the determination of the change in the electrical resistance $\Delta \rho_1 = \rho_1 - \rho_{01}$, where ρ_{01} is the electrical resistance of an ideal lattice at T_1 and ρ is the equilibrium value of the electrical resistance at T_1

$$\Delta\rho = \Delta\rho_1 [1 - \exp(-t/\tau_{r_1})].$$

Orig. art. has: 7 figures and 4 equations.

SUB CODE: 20/11/ SUBM DATE: 07Dec64

Card 3/3 fvj

L 36929-66 EWT(m)/T/EWP(t)/ETI IJP(c) JD

ACC NR: AP6012217 SOURCE CODE: UR/0032/66/032/004/0438/0442

AUTHOR: Bokshteyn, B. S.; Zhikhovitskiy, A. A.; Surmava, G. G.

ORG: Moscow Steel and Alloy Institute (Moskovskiy institut stali i splavov)

TITLE: Method for study of diffusion in whisker crystals

SOURCE: Zavodskaya laboratoriya, v. 32, no. 4, 1966, 438-442

TOPIC TAGS: metal whisker, metal diffusion

ABSTRACT: It is proposed to determine the coefficient of diffusion of a component in a whisker crystal by measurement of its transverse dimension. The results of a study of the diffusion of zinc in whisker crystals of copper have shown that the rate of the diffusion mobility of the zinc atoms in whiskers is 1 to 1.5 orders of magnitude less than in ordinary monocrystalline coppers. The article gives a detailed flow sheet of the equipment used to study this phenomenon. Experimental results are given in a series of curves. The results indicate that the rate of growth of the whiskers actually limits diffusion. Orig. art. has: 15 formulas and 3 figures.

SUB CODE: 07, 20/ SUBM DATE: none/ ORIG REF: 002/ OTH REF: 005

Card 1/1 UDC: 532.72

BOKSHTEYN, F. S.

"Modified Esophagoscopic Tube," Vest. Oto-rino-laringol., No. 3, 1948.

2nd Mosocow Med. Inst. , Clinic for Ear, Nose and Throat Diseases.

Bokshteyn, F.S. "On the problem of naso-orbital osteomas," Sbornik nauch. rabot, posvyashch. pamyati akad. Aberbakha, Moscow-Leningrad, 1948, p. 29-31

SO: U-3264, 10 April 1953, (Letopis 'Zhurnal 'nykh Statey, No. 3, 1949)

BOKSHTEYN, F.

PA 64/49T88

USSR/Medicine - Scientists May/Jun 49
Medicine - Otoneurology

"The Sixtieth Birthday of Professor Genrikh Solomonovich Tsimmerman," Prof F. Bokshteyn, 2¼ pp

"Vest Oto-Rino-Laringol" No 3

G. S. Tsimmerman, born in Warsaw in Dec 1888, was honored 18 Feb, 49, when the title of Doctor of Medical Sciences was conferred on him by the Acad Med Sci on the basis of his work as one of the foremost otoneurologists of the USSR. This work includes 42 scientific publications, and had advanced him to superintendent, Otoneurol Dept Inst of Psychiatry, Academy Med Sci USSR, and

64/49T88

USSR/Medicine - Scientists (Contd) May/Jun 49

superintendent, Otoneurol Dept, Fourth Moscow City Hosp. Includes a picture.

64/49T88

BOKSHTEYN, F. S.

33591. Materialy K Voprosu O Prioritetie I Rolt Otechestvennykh Otolaringologov V Razrabotke Khirurgicheskikh Metodov Lecheniya Zabolevaniy Ukha, Nosa I Gorla. Vestnik Otorinolaringologii, 1949, No. 5, c.3-16. Bibliogr: (Ukazatel' Literatury Po Khirurgii Nosa I Gorla). (Ukazatel' Literatury Po Zhirurgii Ukha), c. 13-16

SO: Letopis'nykh Statey, Vol. 45, Moskva, 1949

BOKSHTEYN, F.S.

25286 BOKSHTEYN, F.S. Diagnosticheskie Oshibki Pri Otogennykh Vnutricherepnykh Oslozhneniyakh. Sov. Meditsina, 1949 No. 8. S. 18-19
19. Nevrologiya. Psikhiatriya

SO: Letopis' No. 33, 1949

BOKSHTEYN, F. S.

"Review of Prof. D. I. Zimont's Book' 'Surgery of the Upper Respiratory Tract,', Khirurgiya, No. 10, 1949.

BOKSHTEYN, F.S.

Diagnostic errors and their causes in otogenous intracranial complications. Uchen. zapiski ortor. moskov. med. Inst. Stalina Vol 2:106-109 1951. (CIML 21:4)

1. Professor. 2. Clinic for Diseases of the Ear, Nose, and Throat (Director--Honored Worker in Science Prof. B.S. Preobrazhenskiy).

BOKSHTEYN, F.S.

Otogenous meningitis according to data of the Clinic for Ear, Throat, and Nose Diseases of the I. V. Stalin Second Moscow Medical Institute. Vest. otorinolar., Moskva 14 no. 5:55-59 Sept-Oct 1952. (CLML 23:3)

1. Professor.

BOKSHTEYN, Feliks Samoylovich

[Intranasal surgery] Vnutrinosovaia khirurgiia. Moskva, Medgiz, 1956. 230 p. (MLRA 9:10)

(NOSE--SURGERY)